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Editorial: Workshop - emerging separation technologies for water treatment and air filtration

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Editorial on the Research Topic

[Workshop - emerging separation technologies for water treatment and air filtration](#)

The TESTEA-STM 2023, Algiers's three-day workshop hosted by ANVREDET (Algeria's National Agency for the Valorization of Research and Technological Development) in 2023, experienced a high turnout from start to finish, reflecting Algeria's interest in pursuing scientific excellence in membrane and separation processes through strong regional partnerships. Presentations, panels, and site tours (seawater desalination, domestic and industrial effluent recycling, and renewable energy supply) led to pertinent and engaging discussions among students, civil society stakeholders, and world-class experts in seawater RO (SWRO) desalination, wastewater effluent recycling, membrane and filtration media manufacturing, and renewable energy technologies. The conclusions and recommendations of the event advocated for the publication of peer-reviewed scientific articles aligned with the workshop's theme, given the quality and originality of the lectures.

Consequently, our editorial team is now delighted to share five Frontiers articles on this forward-looking Research Topic with a broad audience.

More specifically, [Anim-Mensah et al.](#) examined the steps taken by Algeria to streamline its green energy transition by gradually restricting its fossil fuel production while scaling up its green hydrogen infrastructure, which will have a gas supply capacity of 15 million tons/year by 2050. [Ouali et al.](#) acknowledged the need to expand SWRO desalination capabilities in North Africa and enhance the supply of clean water due to recurring drought crises. The authors' instructive approach identified benchmark parameters to critically assess the sustainability of SWRO solutions—i.e., decentralized water operations, green energy and power storage capacity, recycled electronic waste/materials, and local supply chain integration. Algeria is also committed to upgrading its wastewater treatment facilities, consistent with the need to adopt a holistic water resource management strategy. [Ben Salah et al.](#) offered unique insights into the deployment of hybrid separation processes comprising recyclable natural clay adsorbents as a pretreatment step to the ultrafiltration/nanofiltration final stage. This tertiary treatment system illustrated the impact of circularity through the potential reuse of high-quality wastewater effluents and recycling of adsorptive materials. The workshop organizers sought to educate the next-generation of specialists in membrane science and

renewable energy technologies, and [Tabi et al.](#)'s overview study responded to their aspirations. Based on a comprehensive literature review discussing the prevalence of NF/RO spiral wound module technology in groundwater treatment, the authors shared fresh perspectives on the relationship between membrane module design, filtration system performance, and plant operation. Sustained collaborative efforts among experts from France, Algeria, and other African states were essential to complete this highly interactive and impactful workshop. TESTEA-STM participants and contributors to this Research Topic expressed interest in meeting again in Algeria to foster more partnerships in the region.

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